	Application No.	Applicant(s)
Notice of Allowability	09/683,696	REBELLO ET AL.
	Examiner	Art Unit
	Ayal I. Sharon	2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *After-Final Amendment filed 5/11/2006*.

2. ☒ The allowed claim(s) is/are *1,3,4,6,8-24,26,28-37,41 and 42*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some*   c) ☐ None ㆍof the:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

        3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

        1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____ .

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of

        Paper No./Mail Date _____ .

    Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application

6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

DETAILED ACTION

Introduction

1. Claims 1, 3-4, 6, 8-24, 26, 28-37, and 41-42 of U.S. Application 09/683,696, originally filed on 2/5/2002 are currently pending.

2. There was a clerical error in the previous Office Action. The Khurana reference was incorrectly cited as teaching the limitations of claims 40-42.

Examiner's Amendment

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

4. Authorization for this examiner's amendment was given in a telephone interview with Mr. Patrick Yoder, Reg. No. 37,479 on 12/7/06.

5. Claim 1 in the application has been amended as follows.

In claim 1, line 1, the phrase:

> "A method of re-engineering"

has been changed to:

> "A computer-implemented method of modeling"

In addition, in claim 1, line 13, the phrase:

"creating a tooling master model"

has been changed to:

"creating, and storing as a computer file, a tooling master model"

Support for these amendments is found in paragraphs [0061] and [0079] of the specification.

6. Claim 24 in the application has been amended as follows.

In claim 24, line 1, the phrase:

"A system for re-engineering"

has been changed to:

"A computer-implemented system for modeling"

In addition, in claim 24, line 19, the phrase:

"parametric master model, and to create a tooling master model"

has been changed to:

"parametric master model, and to create and store as a computer file a

tooling master model"

Support for these amendments is found in paragraphs [0061] and [0079] of the specification.

Examiner's Statement of Reasons for Allowance

7. Claims 1, 3-4, 6, 8-24, 26, 28-37, and 41-42 are allowed.

8. The following is an examiner's statement of reasons for allowance for

independent claims 1, 24, and 36. All other claims depend from these

independent claims.

9. The prior art referred to in this Reasons for Allowance is as follows:

   a. Khurana et al., U.S. Patent 6,735,489. ("**Khurana**").

   b. Liasi et al., U.S. Patent PG-PUB 2002/0090130 ("**Liasi**").

   c. Sebastian, U.S. Patent 5,822,206. ("**Sebastian**").

10. In regards to Claim 1, Khurana teaches the following limitations:

> *1. A method of re-engineering a part comprising:*
>
> *generating a parametric master model for the part from an editable geometry for the part;*

See Khurana, especially: col.2, lines 23-42, where Khurana teaches the following:

"Model" refers to the part that is being modeled in the CAD/CAM software.
The model comprises a plurality of "features".

"Parametric modeling capabilities" refers to the ability to place mathematical
constraints or parameters on features of the model so that the
features may be edited and changed later. Models that do not have this
capability are referred to as "dumb solids." Most CAD/CAM systems support
parametric modeling.

> *generating a manufacturing context model from a design master model, the design master model comprising the parametric master model and the manufacturing context model comprising a plurality of tooling features; and*

See Khurana, especially: col.7, lines 8-15, where Khurana teaches the following
(emphasis added):

As seen in FIG. 5, in Unigraphics software, this linkage between the Master Process Model 20 and the process sheets 23 is preferably achieved through the use of extracted in-process models, called virtual extracts 22, that are linked to the Master Process Model. Each virtual extract represents a step in the manufacturing process and each is a child of the Master Process Model. Any changes to the Master Process Model are automatically reflected in all the relevant extracts, but changes to the extracts have no effect on the Master Process Model.

> *creating a tooling master model from the manufacturing context model, the tooling master model comprising a tooling geometry for the part.*

See Khurana, especially: col.7, lines 37-47, where Khurana teaches the following:

Further, the principle of the process may be extended further downstream in the manufacturing process model by utilizing the electronic data for CNC programs, tooling (i.e., cutting tool selection), and fixture design by direct transmission to the machining tools without the need for process sheets and human intervention. This may be achieved in the Unigraphics environment by creating a reference set to the extract and bringing it in to a new file via virtual assembly. The extract is used to create corresponding geometry. Software must then be provided to adapt the CAD/CAM software to translate the geometry into CNC form.

Khurana, however, does not expressly teach the following limitations:

> *obtaining geometric data characterizing the part; and*

> *generating the editable geometry for the part from the data.*

Liasi, on the other hand, does expressly teach them (see paragraph [0017]):

> The shape of the tool may also be compared to the master design for the part and shape of successive re-works of the tool may be compared with each other to establish relationships of how the part shape changes in consequence of changes in the geometry of the tool. This can provide data useful in any further re-work of the tool and a history that can be used in the design of other tools.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Khurana's teachings with those of Liasi, because

doing so would help in "useful in any further re-work of the tool and a history that can be used in the design of other tools.." (see Liasi, para. [0017]).

However, neither Khurana nor Liasi teach the following limitations:

> *wherein said generation of the editable geometry for the part comprises:*
>
> > *generating a non-parametric computer aided design (CAD) model for the part from the geometric data; and*
> >
> > *reconstructing the non-parametric CAD model to obtain the editable geometry, said reconstruction comprising performing reverse CAD modeling.*

Khurana teaches away from the following limitations. Khurana teaches (see col.2, lines 36-42) that "Models that do not have this [parametric CAD modeling] capability are referred to as 'dumb solids.' Most CAD/CAM systems support parametric modeling." Khurana implies that non-parametric CAD models constitute a step backwards in the art, however, Khurana does not teach the element of "reconstructing the non-parametric CAD model to obtain the editable geometry".

11. In regards to Claim 24, Khurana teaches the following limitations:

> *24. A system for re-engineering a part comprising:*
>
> > *a part design master model module configured to generate a parametric master model for the part from an editable geometry for the part; and*

See Khurana, especially: col.2, lines 23-42, where Khurana teaches the following:

"Model" refers to the part that is being modeled in the CAD/CAM software. The model comprises a plurality of "features".

"Parametric modeling capabilities" refers to the ability to place mathematical constraints or parameters on features of the model so that the features may be edited and changed later. Models that do not have this capability are referred to as "dumb solids." Most CAD/CAM systems support parametric modeling.

> a tooling master model module configured to receive the parametric
> master model, to generate a manufacturing context model from the
> parametric master model, and

See Khurana, especially: col.7, lines 8-15, where Khurana teaches the following (emphasis added):

As seen in FIG. 5, in Unigraphics software, this linkage between the Master Process Model 20 and the process sheets 23 is preferably achieved through the use of extracted in-process models, called virtual extracts 22, that are linked to the Master Process Model. **Each virtual extract represents a step in the manufacturing process** and each is a child of the Master Process Model. Any changes to the Master Process Model are automatically reflected in all the relevant extracts, but changes to the extracts have no effect on the Master Process Model.

> to create a tooling master model from the manufacturing context
> model, wherein the manufacturing context model comprises a plurality of
> tooling features and the tooling master model comprises a tooling
> geometry.

See Khurana, especially: col.7, lines 37-47, where Khurana teaches the following:

Further, the principle of the process may be extended further downstream in the manufacturing process model by utilizing the electronic data for CNC programs, tooling (i.e., cutting tool selection), and fixture design by direct transmission to the machining tools without the need for process sheets and human intervention. This may be achieved in the Unigraphics environment by creating a reference set to the extract and bringing it in to a new file via virtual assembly. The extract is used to create corresponding geometry. Software must then be provided to adapt the CAD/CAM software to translate the geometry into CNC form.

Khurana, however, does not expressly teach the following limitations:

> wherein said part design master model module comprises:
> a computer aided design (CAD) system configured to generate the
> parametric master model from the editable geometry; and
>
> a knowledge based engineering (KBE) environment configured to
> apply a plurality of knowledge based engineering (KBE) part design
> generative rules to the editable geometry to obtain the parametric master
> model, and to apply a plurality of KBE part design checking rules to the

> *parametric master model to ensure that the parametric master model*
> *satisfies a plurality of functional and manufacturability requirements;*

Sebastian, on the other, hand, does expressly teach the use of knowledge based engineering. (See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Khurana's teachings with those of Sebastian, because doing so was "a known approach" at the time (see Sebastian, col.3, line 65 – col.4, line 2.).

However, neither Khurana, Sebastian nor Pang, either individually or in combination, expressly teach the following specific list of items:

> *a linked model environment configured for creating at least one design*
> *analysis context model, the context model comprising an associative copy*
> *of the parametric master model and being configured for performing an*
> *engineering analysis; and*

> *an engineering analysis code for performing the engineering analysis to*
> *generate engineering analysis data for evaluating the parametric master*
> *model;*

12. In regards to Claim 36, Khurana teaches the following limitations:

> *36. A method of manufacturing comprising:*
>
> > *generating a parametric master model for a part from an editable*
> > *geometry for the part;*

See Khurana, especially: col.2, lines 23-42, where Khurana teaches the following:

"Model" refers to the part that is being modeled in the CAD/CAM software. The model comprises a plurality of "features".

"Parametric modeling capabilities" refers to the ability to place mathematical constraints or parameters on features of the model so that the features may be edited and changed later. Models that do not have this capability are referred to as "dumb solids." Most CAD/CAM systems support parametric modeling.

> generating a manufacturing context model from the parametric
> master model, the manufacturing context model comprising a plurality of
> tooling features;

See Khurana, especially: col.7, lines 8-15, where Khurana teaches the following
(emphasis added):

As seen in FIG. 5, in Unigraphics software, this linkage between the Master
Process Model 20 and the process sheets 23 is preferably achieved through the
use of extracted in-process models, called virtual extracts 22, that are linked to
the Master Process Model. **Each virtual extract represents a step in the
manufacturing process** and each is a child of the Master Process Model. Any
changes to the Master Process Model are automatically reflected in all the
relevant extracts, but changes to the extracts have no effect on the Master
Process Model.

> creating a tooling master model from the manufacturing context
> model, the tooling master model comprising a tooling geometry for the
> part;

See Khurana, especially: col.7, lines 37-47, where Khurana teaches the
following:

Further, the principle of the process may be extended further downstream
in the manufacturing process model by utilizing the electronic data for CNC
programs, tooling (i.e., cutting tool selection), and fixture design by direct
transmission to the machining tools without the need for process sheets and
human intervention. This may be achieved in the Unigraphics environment by
creating a reference set to the extract and bringing it in to a new file via
virtual assembly. The extract is used to create corresponding geometry.
Software must then be provided to adapt the CAD/CAM software to translate the
geometry into CNC form.

> generating a hard tooling using the tooling master model; and

See Khurana, especially: col.7, lines 37-47, where Khurana teaches the
following:

Further, the principle of the process may be extended further downstream
in the manufacturing process model by utilizing the electronic data for CNC
programs, tooling (i.e., cutting tool selection)...

> manufacturing at least one part using the hard tooling and a
> plurality of process parameters.

See Khurana, especially: col.8, lines 61-64 where Khurana teaches the following:

... and generating machining instructions to create a real-world object by manufacturing said form features onto said blank.

Khurana does not expressly teach the following limitations:

> wherein said generation of the parametric master model comprises:
>   applying a plurality of knowledge based engineering (KBE) part design generative rules to the editable geometry to obtain the parametric master model, and
>   applying a plurality of KBE part design checking rules to the parametric master model to ensure that the parametric master model satisfies a plurality of functional and manufacturability requirements,
>   wherein said method further comprises creating at least one design analysis context model for evaluating the parametric master model, the design analysis context model comprising an associative Copy of the parametric master model which is configured for performing an engineering analysis;
>   processing the parametric master model with producibility data from a producibility database to add geometric dimensions and tolerances (GD&T) to the parametric master model,
>   wherein said generation of the manufacturing context model comprises:
>   orienting the parametric master model using the geometric dimensions and tolerances to obtain an oriented GD&T model, and
>   applying a plurality of manufacturing design rules to the oriented GD&T model to obtain the manufacturing context model,
>   wherein the manufacturing design rules comprise a plurality of tooling design rules.

Sebastian, on the other, hand, does expressly teach the use of knowledge based engineering. (See Sebastian, especially: col.3, line 65 to col.4, line 9 and col.5, lines 59-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Khurana's teachings with those of Sebastian, because doing so was "a known approach" at the time (see Sebastian, col.3, line 65 – col.4, line 2).

None of the cited prior art, however, expressly teaches the following limitations:

> *wherein the manufacturing context model is generated for a plurality of manufacturing steps.*

13. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached at (571) 272-3753.

Any response to this office action should be faxed to (571) 273-8300, or mailed to:

USPTO
P.O. Box 1450
Alexandria, VA 22313-1450

or hand carried to:

USPTO
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon
Art Unit 2123
December 11, 2006

KAMINI SHAH
SUPERVISORY PATENT EXAMINER